Components

1   Arduino Mega 2560
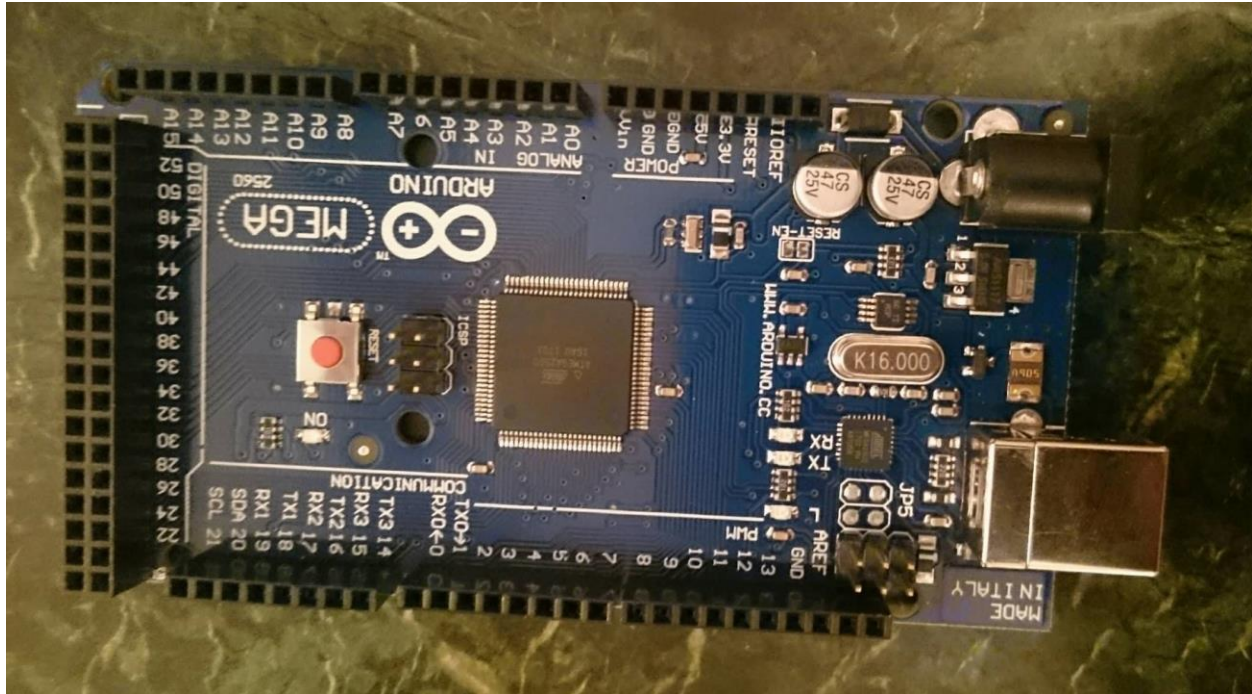
Price: 250 LE

Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	54 (of which 14 provide PWM output)
Analog Input Pins	16
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 Ma
Clock speed	16MHz

2 L298 Motor Driver Dual
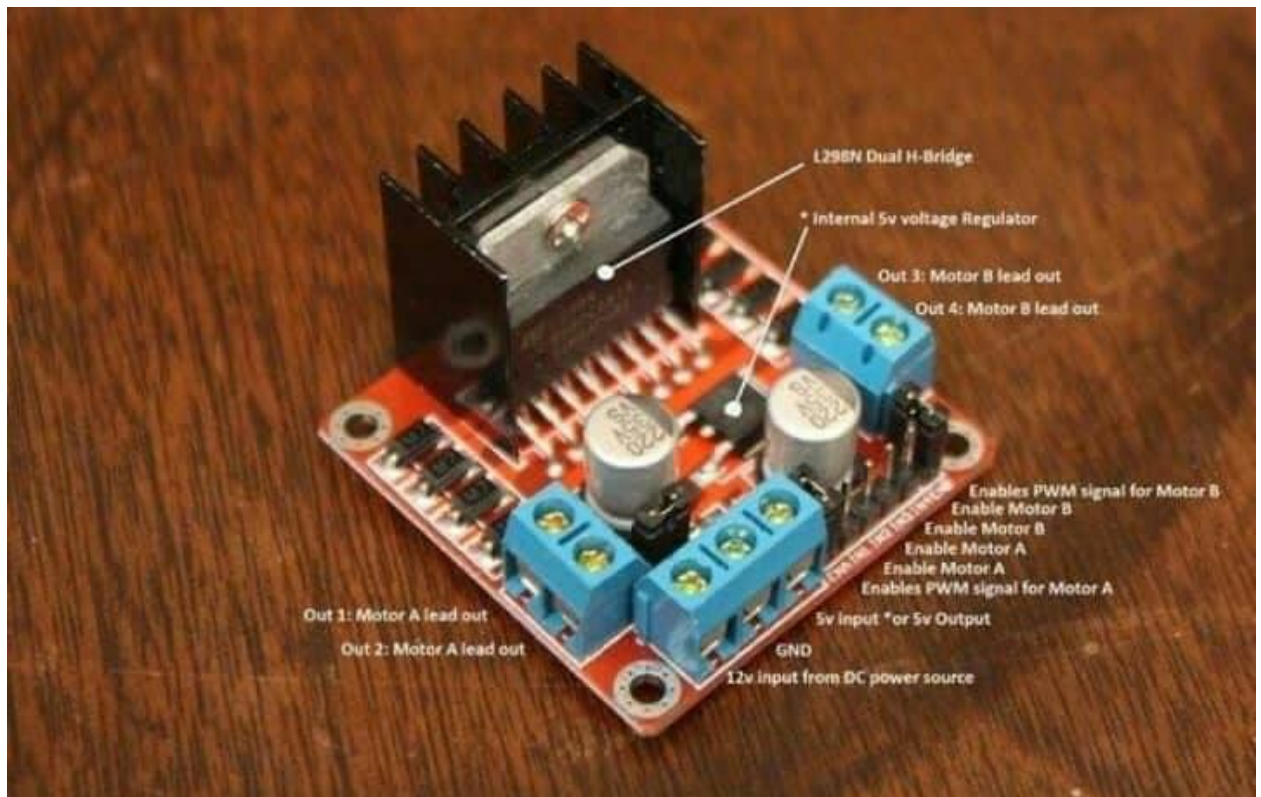
Price: 45 LE

The PINS connections, we have 8 (From left to right):

- 5v
- GND
- ENB (Motor B enable PIN)
- IN4 (Motor B direction 2 PIN)
- IN3 (Motor B direction 1 PIN)
- IN2 (Motor A direction 2 PIN)
- IN1 (Motor A direction 1 PIN)
- ENA (Motor A enable PIN)

3 Lithium Battery

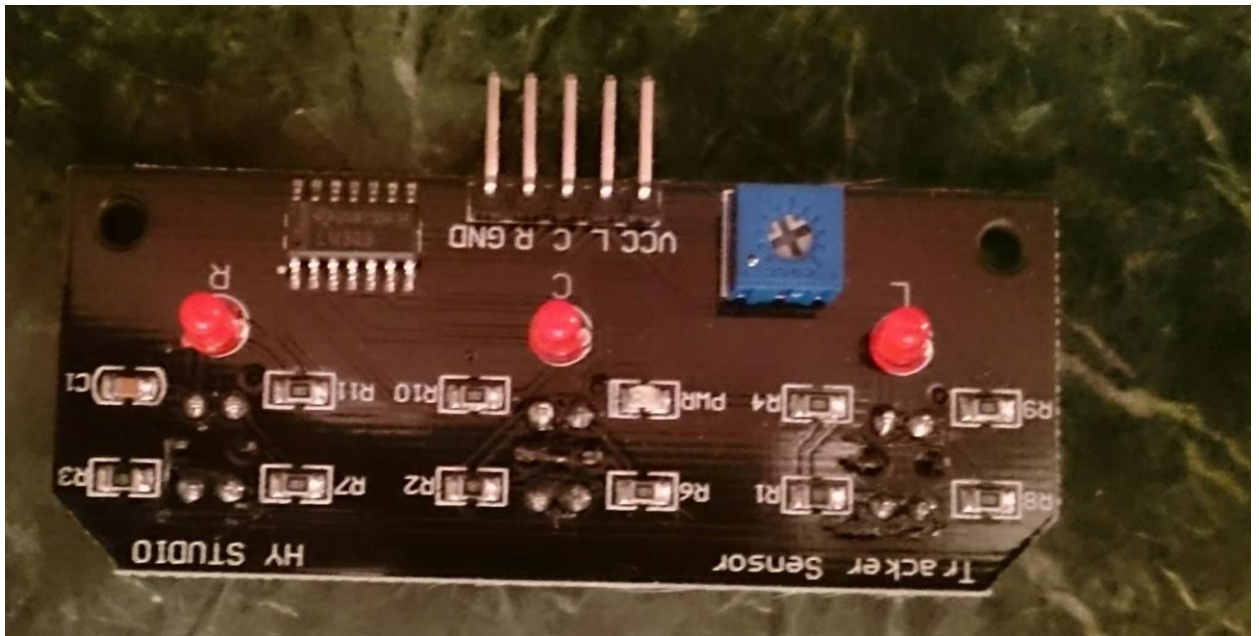Price: 45 LE

We will use 3 lithium batteries in our project

- *High energy density:*   The much greater energy density is one of the chief advantages of a lithium ion battery or cell. With electronic equipment such as mobile phones needing to operate longer between charges while still consuming more power, there is always a need to batteries with a much higher energy density. In addition to this, there are many power applications from power tools to electric vehicles. The much higher power density offered by lithium ion batteries is a distinct advantage.
- *Self-discharge:*   One issue with batteries and ells is that they lose their charge over time. This self-discharge can be a major issue. One advantage of lithium ion cells is that their rate of self-discharge is much lower than that of other rechargeable cells such as Ni-Cad and NiMH forms.
- *No requirement for priming:*   Some rechargeable cells need to be primed when they receive their first charge. There is no requirement for this with lithium ion cells and batteries.
- *Low maintenance:*   One major lithium ion battery advantage is that they do not require and maintenance to ensure their performance. Ni-Cad cells required a periodic discharge

to ensure that they did not exhibit the memory effect. As this does not affect lithium ion cells, this process or other similar maintenance procedures are not required.

- *Variety of types available:*   There are several types of lithium ion cell available. This advantage of lithium ion batteries can mean that the right technology can be used for the particular application needed. Some forms of lithium ion battery provide a high current density and are ideal for consumer mobile electronic equipment. Others are able to provide much higher current levels and are ideal for power tools and electric vehicles.

4_Line Follower
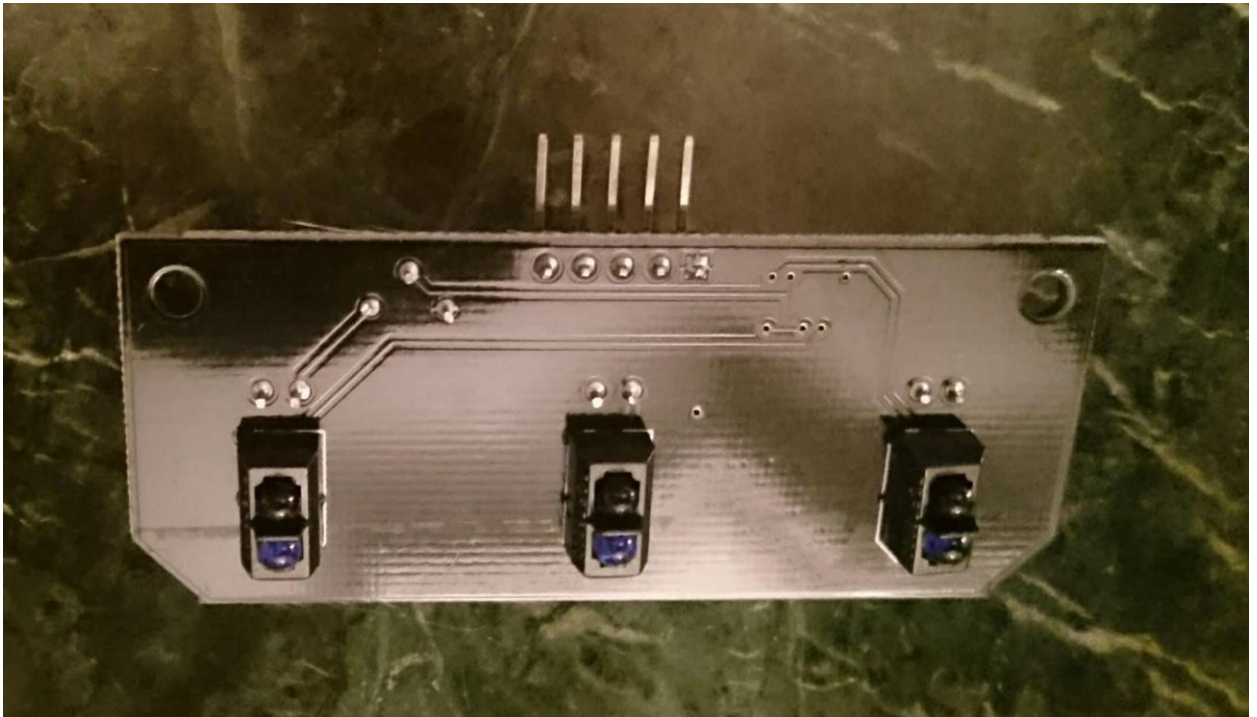
Price: 45 LE

The Line Follower sensor is an add-on for your RedBot that gives your robot the ability to detect lines or nearby objects. The sensor works by detecting reflected light coming from its own infrared LED. By measuring the amount of reflected infrared light, it can detect transitions from light to dark (lines) or even objects directly in front of it.

5 Bluetooth Module
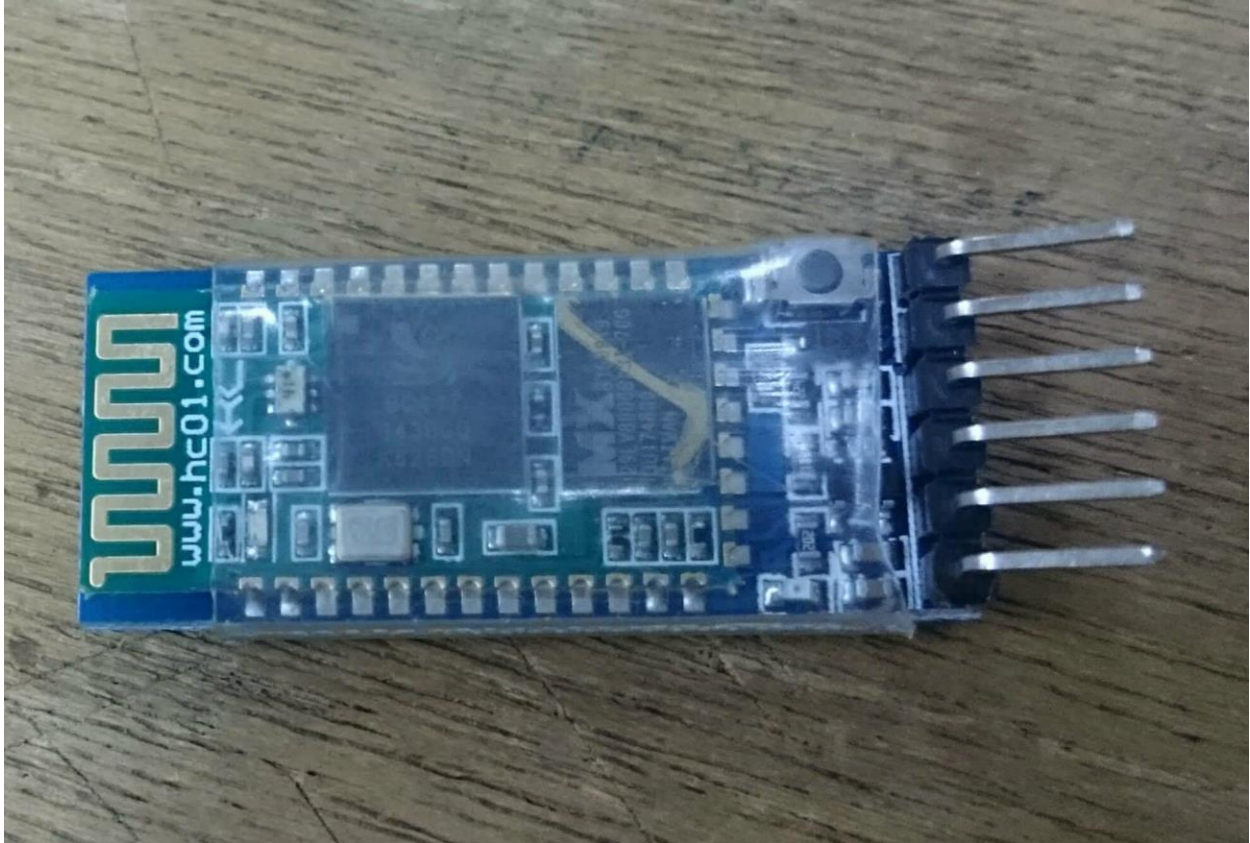
Price:60

This HC-06 Bluetooth module is the most economical and easiest way to go wireless.

This module allows you to wirelessly extend your serial interface, Hence any program running on your Laptop feels its controlling a local serial port (which is over a wireless Bluetooth link)

The 4 pins are +5V, GND, TXD, RXD. Supply voltage should be 3.3 - 6 V. Absolute maximum is 7 V.

6 Ultrasonic
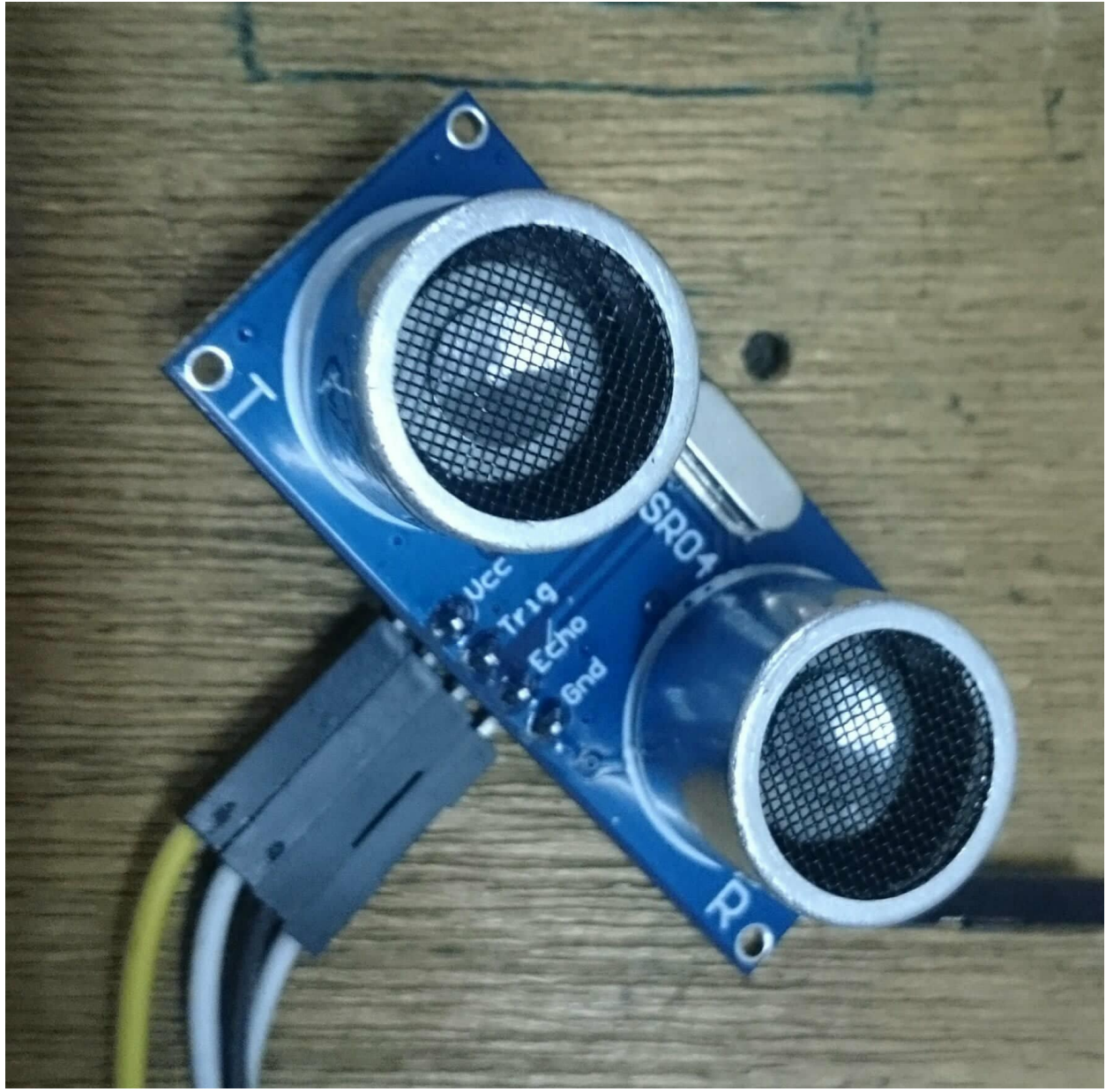
Price: 45

Understanding Ultrasonic Ultrasonic Sensing/Control Basics Ultrasonic signals are like audible sound waves, except the frequencies are much higher. Our ultrasonic transducers have piezoelectric crystals which resonate to a desired frequency and convert electric energy into acoustic energy and vice versa. The illustration shows how sound waves, transmitted in the shape of a cone, are reflected from a target back to the transducer. An output signal is produced to perform some kind of indicating or control function. A minimum distance from the sensor is required to provide a time delay so that the "echoes" can be interpreted. Variables which can effect the operation of ultrasonic sensing include: target surface angle, reflective surface roughness or changes in temperature or humidity. The targets can have any kind of reflective form – even round objects.